



Navigating Inherited Cost Models

How to Decompose and Understand Cost Models

Post Development





Introduction



(Success)



(Failure)





Introduction

NASA Estimating Process

1. Receive Customer Request & Understand the Project
2. Prepare or Obtain WBS
3. Obtain/Participate in the Development of the Project Technical Description
4. Develop GR&As
5. Select Cost Estimating Methodology
6. Select/Construct Cost Model
7. Gather & Normalize Data
8. Develop Point Estimate
9. Develop Reserves from Cost Ranges/Cost Risk Assessments
10. Document the Cost Estimate
11. Present/Brief Results
12. Update Cost Estimates on a Regular Basis

SCEA Estimating Process

1. Develop WBS
2. Develop a Program/System Baseline
3. Collect Data
4. Analyze Data
5. Develop Cost Estimating Methodologies
6. Calculate & Validate Cost Estimate
7. Generate Required Reporting Outputs

The issue of inheritance isn't addressed for analysts.





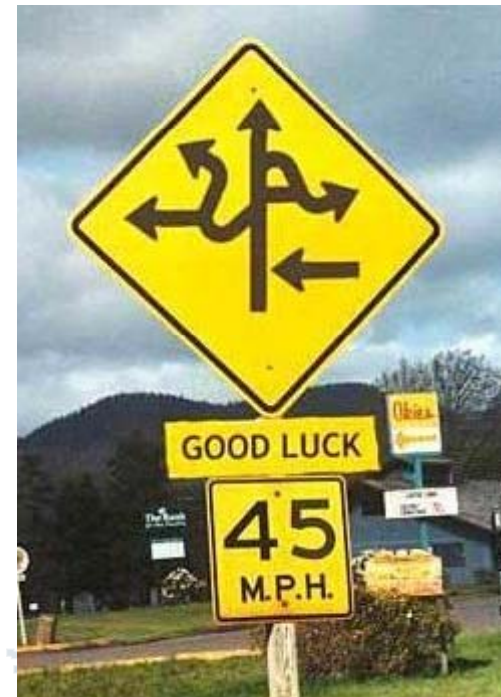
Problem Statement

■ Problem

- You just inherited an ACE cost model from the original developer and you will be responsible for its operation and refinement, however you have no idea how it works.

■ Solution

- Decompose the model step-by-step through a sound decomposition process.

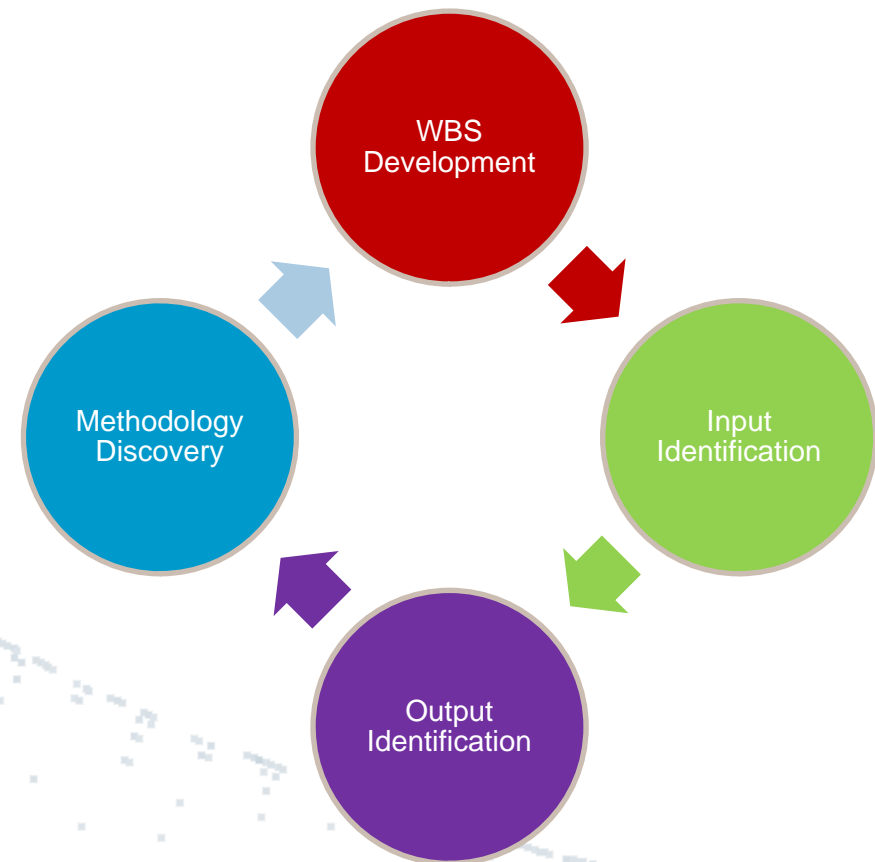




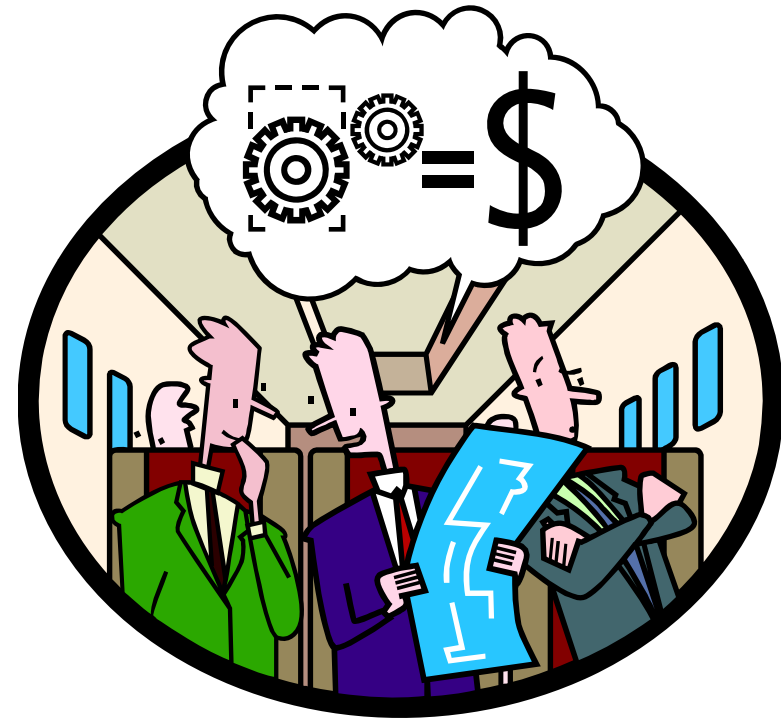
General Approach

1. Identify WBS Structure
2. Identify Key Inputs
3. Identify Key Outputs
4. Understand Modeling Methodologies

➤ *Working the estimating process in reverse order!*



- Not all WBSs are obvious to the analyst.
- Some WBSs are wrapped and re-wrapped throughout a cost model (e.g. tiered correlation).
- Often the WBS is the product of many different iterations yielding a lack of organization.





Mapping the WBS

- ACEIT comes with pre-packaged project WBSs for major DoD programs.
- If the existing WBS is disorganized, ACE's WBS expansion tool can help.

New Session

Program

Name: My Program

Base Year: 2009

Units: K Currency: \$

First Year: 2009 Last Year: 2019

Maximum Rows: 200

Default Case: Point Estimate

WBS/CES Initialization

Use system WBS/CES indenture structure(s)

Use a session template

WBS/CES Selection

- AIRCRAFT SYSTEM
- AIRCRAFT SYSTEM WBS (ESH)
- ARMY CES (AIRCRAFT)
- ARMY CES (AIS)
- ARMY CES (ELECTRONICS)
- ARMY CES (GENERIC)
- ARMY CES (MISSILE)

Show All Show System Show Custom





Mapping the WBS

ACE 7.1a - [Session1 - WBS/CES (BY2009SK)]

	WBS/CES Description	CES Number	WBS/Item Number
14	*My Program Estimate		
15			
16	ARMY CES (AIS)		
17	DEVELOPMENT	1.0	
18	PRODUCTION	2.0	
19	OPERATIONS & SUPPORT (O&S)	3.0	
20			
21	*INPUT VARIABLES		
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			

ACE 7.1a - [Session1 - WBS/CES (BY2009SK)]

WBS Expansion Tool

	WBS/CES Description	CES Number	WBS/Item Number
14	*My Program Estimate		
15			
16	ARMY CES (AIS)		
17	DEVELOPMENT	1.0	
18	DEVELOPMENT ENGR	1.01	
19	PRODUC ENG & PLANNING (PEP)	1.02	
20	TOOLING	1.03	
21	PROTOTYPING	1.04	
22	DOCUMENTATION/DATA	1.05	
23	TEST AND EVALUATION	1.06	
24	SYSTEM/PROJECT MGMT	1.07	
25	DEVELOPMENTAL TNG	1.08	
26	FACILITIES	1.09	
27	SOFTWARE DEVELOPMENT	1.10	
28	HARDWARE DEVELOPMENT	1.20	
29	DEVELOPMENTAL LOG SPT	1.30	
30	OTHER DEVELOPMENT COSTS	1.40	
31	PRODUCTION	2.0	
32	OPERATIONS & SUPPORT (O&S)	3.0	
33			
34	*INPUT VARIABLES		
35			
36			
37			

Expand the current WBS/CES item into lower level it





What are the inputs?

- The inputs drive the estimate.
- When the inputs are clearly diagrammed, the estimate's structure and methodology begin to have focus.
- Input discovery and definition also reveals key assumptions.





What are the inputs?

- The Traceback Navigator is a key development tool in ACE.
- Similar to Excel's precedent diagramming function.
- Easier to use with easier access to input variables backwards and forwards.

Traceback Navigator

	WBS/CES Description	Approp	Unique ID	Point Estimate
16	XYZ CES (MISSILE)			\$ 322.945 *
17	RDT&E FUNDED ELEMENTS	RDTEA	RDTE\$	\$ 106.031 *
18	DEVELOPMENT ENGINEERING	RDTEA	RDTEDE\$	\$ 38.438 *
19	AIR VEHICLE (HARDWARE)	RDTEA		\$ 19.926 *
20	AIR VEHICLE (SOFTWARE)	RDTEA	RDAVSW\$	\$ 18.511 *
21	PROTOTYPE MANUFACTURING	RDTEA	RDTEPM\$	\$ 15.043 *
22	PROCESSOR	RDTEA		\$ 2.183 *
23	AMPLIFIERS	RDTEA		\$ 10.101 *
24	COTS ANTENNA	RDTEA		\$ 2.759 *
25	SYSTEMS ENGINEERING/MGMT	RDTEA	RDTESEPM\$	\$ 32.337 *
26	CONTRACTOR	RDTEA	RDTEPMAS\$	\$ 20.215 *
27	GOVERNMENT	RDTEA	RDTESEPMG\$	\$ 12.122 *
28	SYSTEMS TEST AND EVAL	RDTEA	RDTESTE\$	\$ 11.099 *
29	CONTRACTOR	RDTEA	RDTESTEMAS\$	\$ 2.256 *
30	GOVERNMENT	RDTEA	RDTESTEG\$	\$ 8.842 *
31	TRAINING	RDTEA	RDTESTNG\$	\$ 0.000 *
32	OTHER RDT&E	RDTEA	RDTEOS\$	\$ 9.114 *
33	RDT&E FEE	RDTEA	RDTEFE\$	\$ 9.114 *
34				
35	PROCUREMENT FUNDED ELEMENT	MIPA	PROCS\$	\$ 158.350 *
36	RECURRING PRODUCTION	MIPA	PROCRP\$	\$ 95.452 *
37	MANUFACTURING	MIPA	PROCMAN\$	\$ 87.345 *
38	PROCESSOR	MIPA	OCMANPRCS\$	\$ 10.080 *
39	AMPLIFIERS	MIPA	ROCMANAMPS\$	\$ 57.559 *

Dialog to navigate your session using variable names and dependencies





What are the inputs?

Traceback Navigator (XYZ CES Missile Estimate)

Row: 19: AIR VEHICLE (HARDWARE)

Case: Point Estimate

Equations:

ID	Equation
	DEVENGHWEM * DEVENGHWLR\$
aStartDate	01OCT2008
aFinishDate	30SEP2013

Predecessors:

Row	Description	IC
104	DEVELOPMENT ENGINEERING HAR DEVENGHWEM	
105	DEVELOPMENT ENGINEERING HAR DEVENGHWLR	

ACE 7.1a - [XYZ CES Missile Estimate.aceit - Methodology [BY2009SM]]

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Inputs can be instantly accessed for proper diagramming.





What are the outputs?

- Proper diagramming of outputs reveal estimate's original purpose.
- Understanding key outputs reveal estimate's capabilities for answering what-if drills.
- Output discovery may reveal that further model development is needed.

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Successors:

Row	Description	Total For	Sum of c
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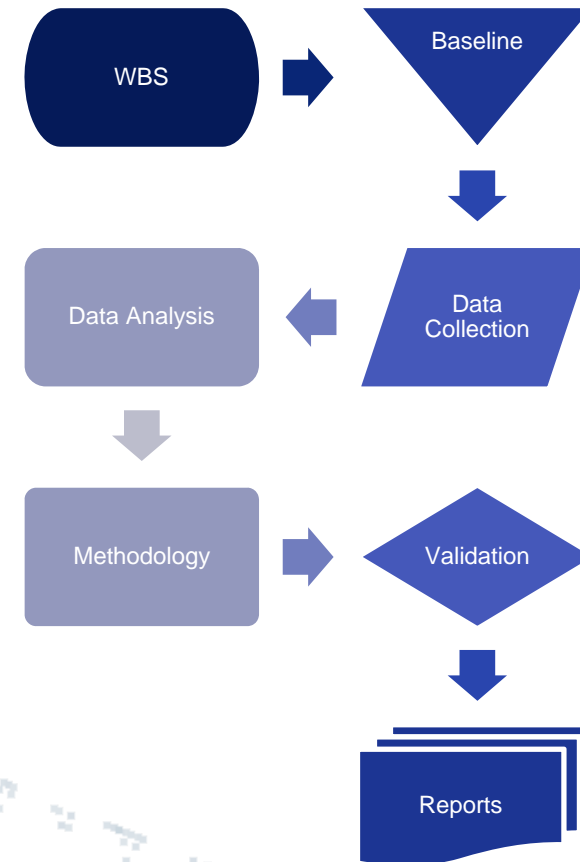
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What is the estimating methodology?

- Easily the most difficult portion of model diagramming.
- Relies heavily on documentation and prior analyst's availability.
- Performing a trace is the best way to handle this when there is no documentation.





Finishing Touches

■ **Don't contribute to the confusion – stick to the estimating process!**

- Insert yourself into the necessary step of the cost estimating process and follow it
 - (Life is much easier for those that follow you)

■ **doc·u·ment**

- verb (used with object)
 1. to furnish with documents.
 2. to furnish with references, citations, etc., in support of statements made: a carefully documented biography.
 3. to support by documentary evidence: to document a case.

